

# Research and Evaluation of the Maine Learning Technology Initiative (MLTI) Laptop Program

## Impacts on Student Achievement

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# Overview of the Maine Learning Technology Initiative (MLTI)

Beginning in 2002, the State of Maine provided all middle school students and their teachers with laptop computers, and provided schools technical assistance and professional development for integrating laptop technology into their curriculum and instruction.

Beginning in 2007, all high school teachers also received a laptop and are currently being offered professional development to enhance their use of the technology.

# **Student Achievement Impact Studies**

- 1. Maine's Middle Schools Laptop Program: Creating Better Writers**
- 2. Improving Mathematics Performance Using Laptop Technology: The Importance of Professional Development for Success**
- 3. Using Laptops to Facilitate Middle School Science Learning: The Results of Hard Fun**



## **Lesson Learned: What Have We Learned From These Studies?**

- 1. Importance of using technology as a learning tool.**
- 2. Teachers must receive strong, meaningful and sustained professional developments and support.**
- 3. Technology use must be appropriate to the task and focused.**
- 4. Assessment needs to be matched to the process of learning using technology.**

## **MLTI: A Work In Progress**

**Many questions remain to be answered, including:**

1. How do you successfully help teachers shift from use of the technology as a delivery tool to use as a learning tool?
2. What is the standard for highly effective use of the technology?
3. How can you use the technology to create more student-centered, constructive classroom?
4. How can the use of technology outside the classroom and inside the classroom complement each other?
5. How can the technology promote effective learning in spite of schools?



**Evaluation of the Texas  
Technology Immersion Pilot**

**Final Outcomes  
(2004–05 to 2007–08)**

Kelly Shapley, Shapley Research Associates  
Anita Givens, Acting Associate Commissioner  
Standards and Programs, Texas Education Agency

# Technology Immersion Model





# Research Purpose and Design

- ▶ Assess the effects of Technology Immersion on teachers and teaching, students and learning, and academic achievement, and identify factors associated with outcomes.
- ▶ Quasi-experimental research design
  - 21 treatment and 21 control schools
  - Grades 6–8 middle schools
  - Student characteristics
    - Economically disadvantaged (about 67%)
    - Racially and ethnically diverse (roughly 58% Hispanic, 7% African American, 36% White)



# Student Cohorts

		Technology Immersion			
	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
2003-04	Baseline				
2004-05	Baseline	Cohort 1			
2005-06	Baseline	Cohort 2	Cohort 1		
2006-07		Cohort 3	Cohort 2	Cohort 1	
2007-08			Cohort 3	Cohort 2	Cohort 1



# Effects on Students and Learning

- ▶ Accelerated growth in technology proficiency; economically disadvantaged students reached proficiency levels that matched the skills of advantaged control students
- ▶ More frequent use of technology applications in core-subject classes
- ▶ More frequent interactions with peers in small-group activities
- ▶ Fewer disciplinary actions
- ▶ Slightly lower school attendance rates



<b>Effects on Achievement</b>	<b>Cumulative Growth</b>			<b>Standard Deviation Units</b>
	<b>Immersion T-score Growth</b>	<b>Control T-score Growth</b>	<b>Mean T-score Difference</b>	
<b>Assessment/Student Cohort</b>				
<b>TAKS Reading, Advantaged</b>				
Cohort 1: 9th graders, post-immersion	0.76	-0.06	0.81 <sup>†</sup>	.08
Cohort 2: 8th graders, 3 immersion years	1.10	0.39	0.70	.07
Cohort 3: 7th graders, 2 immersion years	0.00	-0.21	0.21	.02
<b>TAKS Reading, Disadvantaged</b>				
Cohort 1: 9th graders, post-immersion	2.22	1.41	0.81 <sup>†</sup>	.08
Cohort 2: 8th graders, 3 immersion years	2.02	1.32	0.70	.07
Cohort 3: 7th graders, 2 immersion years	0.22	0.01	0.21	.02
<b>TAKS Mathematics, Advantaged</b>				
Cohort 1: 9th graders, post-immersion	2.14	0.88	1.25	.13
Cohort 2: 8th graders, 3 immersion years	1.27	-0.69	1.96*	.20
Cohort 3: 7th graders, 2 immersion years	0.74	-0.83	1.57*	.16
<b>TAKS Mathematics, Disadvantaged</b>				
Cohort 1: 9th graders, post-immersion	1.63	0.38	1.25	.13
Cohort 2: 8th graders, 3 immersion years	1.81	-0.15	1.96*	.20
Cohort 3: 7th graders, 2 immersion years	0.09	-1.48	1.57*	.16

*Note.* Estimated *T*-score growth for students attending schools with average levels of poverty. Cumulative growth in *T*-score units (mean = 50, standard deviation = 10).

Standard deviation units = *T*-score difference/10. <sup>†</sup> *p* < .06. \* *p* < .05.



# Implementation and Sustainability

- ▶ Implementation of Technology Immersion improved across years...but just a quarter of schools reached substantial immersion
- ▶ Successful Implementation and Sustainability
  - Committed leaders, thorough planning, allocation of financial resources, teacher buy-in, preliminary/ongoing professional development for teachers, commitment to the transformation of student learning
- ▶ Weak Implementation and Sustainability
  - Administrative turnover, noncommittal teachers, insufficient professional development, inadequate school infrastructures, laptop management problems, funding



# Impact of eTxTIP on Other Programs



Informational Resources

[www.txtip.info](http://www.txtip.info)

[www.etxtip.info](http://www.etxtip.info)

Contact

[Anita.Givens@tea.state.tx.us](mailto:Anita.Givens@tea.state.tx.us)

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# Freedom to Learn 2005-2007

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# FTL 2004-2007



- **Context**

- 20,000 laptops in 200 schools across Michigan
- Extensive PD: teachers, Lead Teachers, Coaches & administrators
- Comprehensive evaluation study

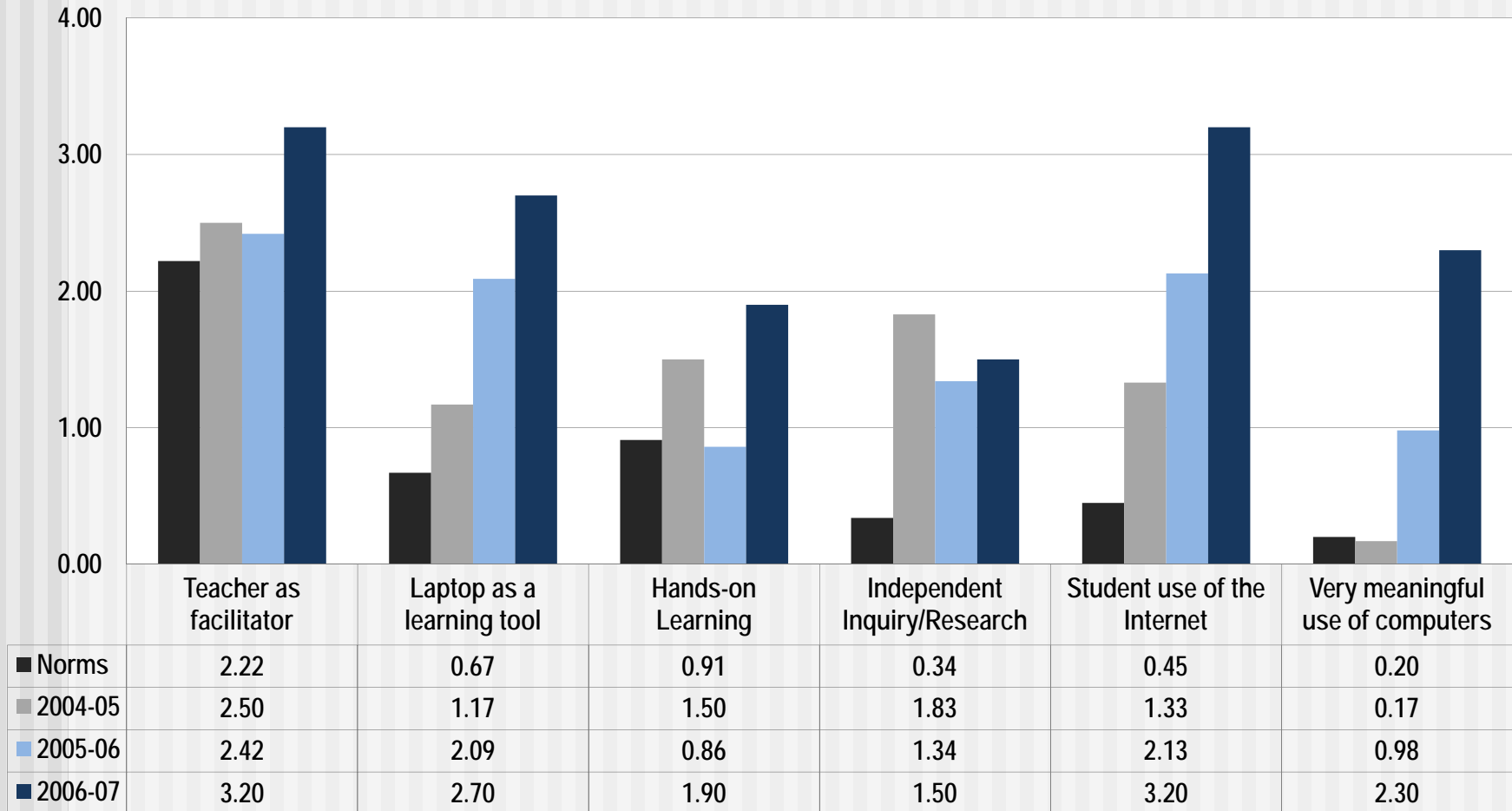
Research Questions	Data Sources
Do FTL <b>teachers</b> use more <b>research-based practices</b> as compared to normative data?	<b>Direct Classroom Observations</b> <ul style="list-style-type: none"><li>• School Observation Measure</li><li>• Survey of Computer Use (759 classrooms)</li></ul>
Do FTL <b>teachers</b> have more <b>positive attitudes</b> as compared to normative data?	<b>Teacher Technology Questionnaire</b> (819 Teachers)
Does FTL improve <b>student attitudes</b> about school and learning?	<b>Student Laptop Survey</b> (14,100 students)
Do FTL <b>students outperform</b> comparison students on MEAP?	<b>MI Education Assessment Program</b> 7 <sup>th</sup> grade: English, math, reading and writing (FTL = 1,145; Comparison = 1,478)



# Do FTL teachers use more research-based practices as compared to normative data?



## Selected Yr 1 to Yr 3 Significant Differences



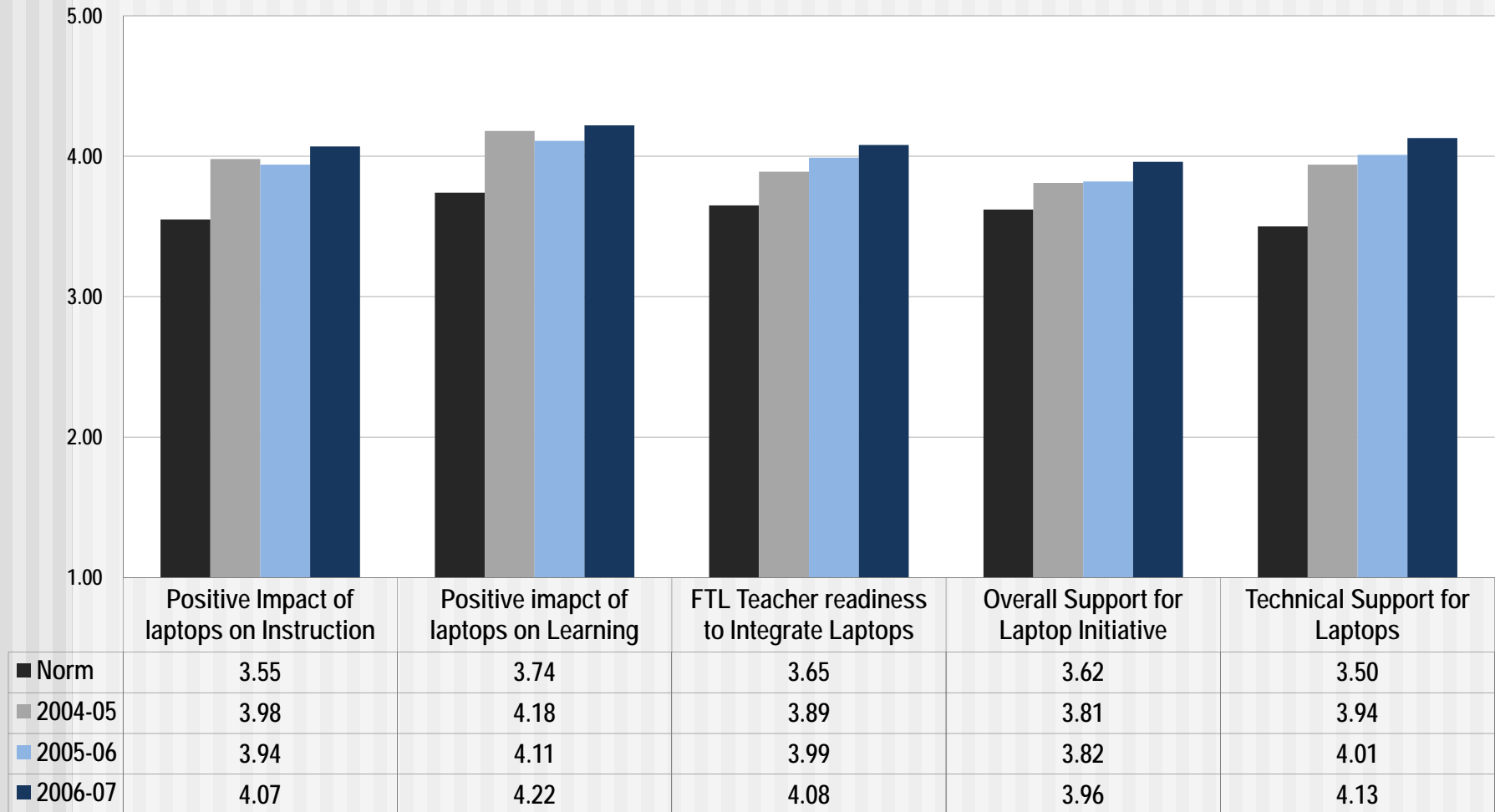
2004-2005 = 060 6th grade classrooms  
 2005-2006 = 599 multiple grade classrooms  
 2006-2007 = 100 multiple grade classrooms

Scale: 0 = Not Observed; 4 = Extensively Observed

# Do FTL teachers have more positive attitudes as compared to normative data?



## Degree of Yr 1 to Yr 3 Teacher Agreement\* vs. CREP Norms



2006-07 CREP Norms  $n = 1,762$

2004-05 FTL Teachers  $n = 279$

2005-06 FTL Teachers  $n = 380$

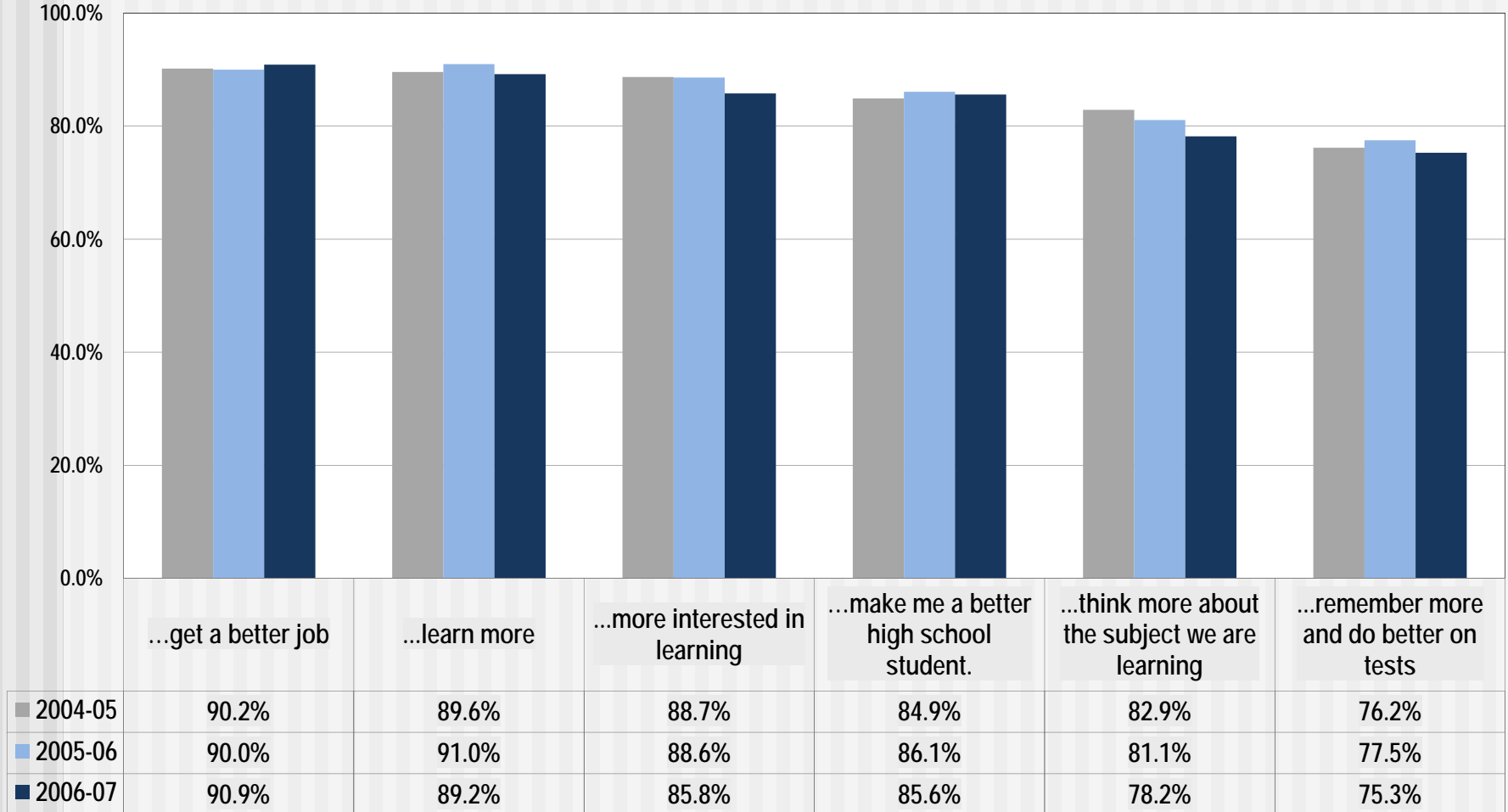
2006-07 FTL Teachers  $n = 160$

Scale: 5 = Strongly Agree; 1 = Strongly Disagree

# Do FTL students have more positive attitudes as compared to normative data?



Percent Agreeing\* that "Using a Laptop has made me..."

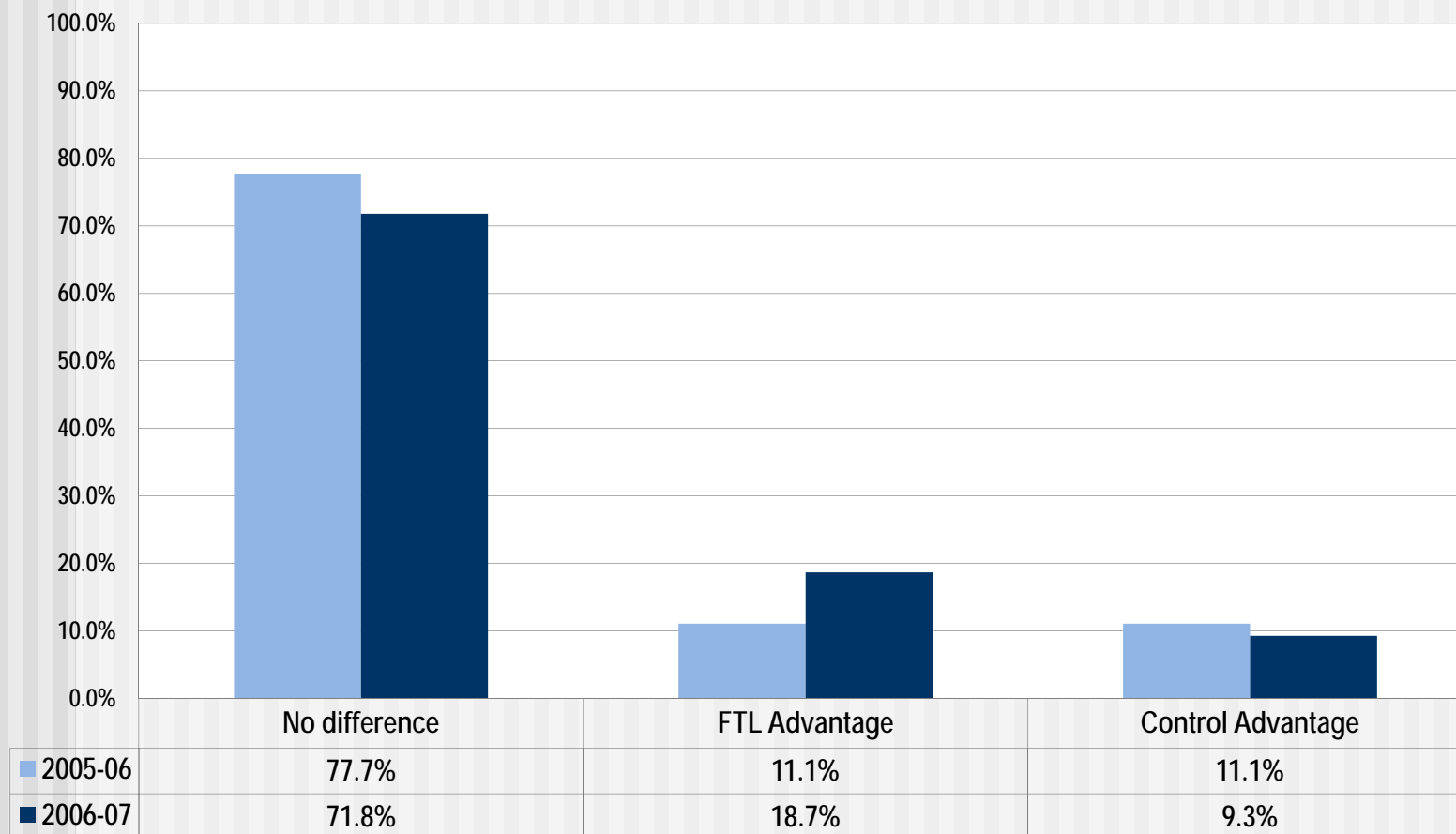


2004-2005  $n = 4,245$   
 2005-2006  $n = 5,770$   
 2006-2007  $n = 4,085$

\*Percent responding "Yes" and "Some"



## Results of FTL vs. Comparison Group Yr 2 and Yr 3 MEAP Analysis



2005-2006: FTL Group *n* = 669  
Comparison Group *n* = 715  
2006-2007: FTL Group *n* = 476  
Comparison Group *n* = 763

# Conclusion

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- It is evident that FTL has been a catalyst for innovative technology interventions that have remained consistent in yielding improved educational opportunities for Michigan's students.
- Further research is needed to refine and address:
  - Implementation of widespread professional development
  - Sustainability of the program: technical resources and support, accountability
  - Methods to assess benefits beyond standardized tests

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# NC 1:1 Learning Technology Initiative

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FOR EDUCATIONAL INNOVATION

# NC 1:1 LTI Evaluation: Research Design

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- Matched Group Design
  - Comparisons of the 1:1 pilot schools to comparable, non-1:1 schools.

Intervention Groups	Comparison Groups
1:1 ECHS ( $n=7$ ) 1033 students; 58 teachers	Non-1:1 ECHS ( $n=7$ ) 830 students; 63 teachers
1:1 Traditional ( $n=1$ ) 1357 students; 86 teachers	Non-1:1 Traditional ( $n=1$ ) 1163 students; 57 teachers





# NC 1:1 LTI Evaluation: Research Design

Project Goals	Evaluation Questions	Data Sources
1. Improve school infrastructure and support systems to meet 21 <sup>st</sup> century needs. (school-level)	* How have school infrastructures and support systems evolved to meet staff and students' 21 <sup>st</sup> century needs?	<ul style="list-style-type: none"> <li>* Policies/Procedures</li> <li>* 1:1 Online Survey</li> <li>* Focus Group/Interviews</li> <li>* Site Visit Checklist</li> </ul>
2. Improve staff attitudes and skills related to technology. (teacher-level)	* How have staff attitudes and skills changed over time?	<ul style="list-style-type: none"> <li>* Classroom Observations</li> <li>* 1:1 Online Survey</li> <li>* Focus Group/Interviews</li> </ul>
3. Enhance instructional practices by facilitating teachers' ability to infuse instructional technology into routine classroom pedagogy. (classroom-level)	* How have teachers' instructional practices changed over time?	<ul style="list-style-type: none"> <li>* Classroom Observations</li> <li>* 1:1 Online Survey</li> <li>* Exemplary Lesson Plans</li> <li>* Focus Group/Interviews</li> </ul>
4. Improve student learning. (student-level)	<ul style="list-style-type: none"> <li>* How have students' 21<sup>st</sup> Century Skills changed over time?</li> <li>* How have student learning and achievement in core academic subjects changed over time?</li> </ul>	<ul style="list-style-type: none"> <li>* Classroom Observations</li> <li>* 1:1 Online Survey</li> <li>* EOCs</li> <li>* Attendance, Discipline</li> </ul>

# NC 1:1 LTI Evaluation Results: Good progress on implementation of infrastructure

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- Connectivity to the school
- Wireless network within the school
- Hiring technology support staff
- Hardware and software resources
- School policies and procedures
- Software images
- Parent information sessions
- Professional development



# NC 1:1 LTI Evaluation Results: Use of technology has increased

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- Use of technology for teaching has increased
  - Planning and Managing Instruction
  - Innovative Instructional Strategies
  - Across all Major Core Content Areas
- Use of technology for learning has increased
  - Innovative Learning Activities
  - Development of 21<sup>st</sup> Century Skills
  - Student Engagement
  - Student Retention



# NC 1:1 LTI Evaluation Results: Major Recommendations

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- Building the Wireless Network
- Selecting Machines
- Attending to the Details
- Committing to New Policies
- Providing Professional Development
- Managing a Classroom Full of Laptops
- Staffing Instructional Support Personnel
- Staffing Technical Support Personnel
- Promoting Innovative Leadership

